

## BOYLE'S LAW

### Purpose:

In this experiment, you will investigate the effect of pressure on the volume of a confined gas, and see the mathematical relationship through a graph of your data.

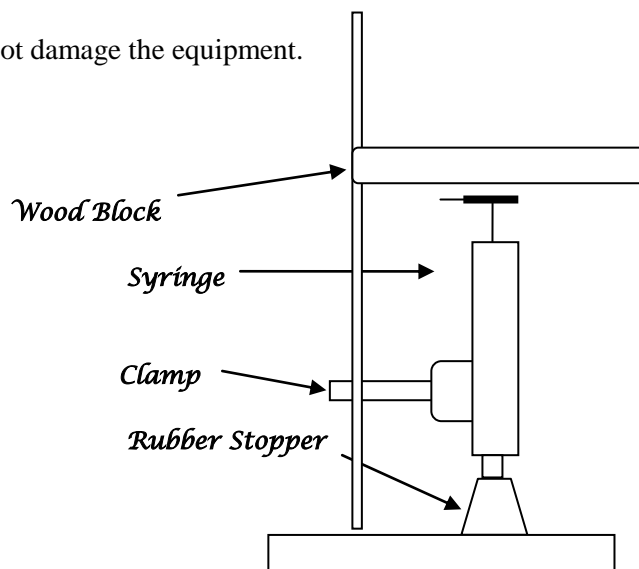
### Equipment

Ring stand, clamp, plastic syringe (sealed) or with cap, 2 wooden blocks, 5 text books with stray papers removed

### Procedure: Pre-lab

1. Examine the syringe. Notice the volume units. Remove the cap and put it in a safe place.
2. Pull out the piston as far as possible. Place the tip against your finger and try to push the piston back in. Do not damage the equipment.
3. Then, try to pull the piston back out. Again, do not damage the equipment.
4. Record your observations.

### Experimental Set-up:



### Experiment

1. With the given materials devise an experiment that will allow you test the relationship between pressure and volume. The materials you have are as follows:
  - Five (5) text books
  - Syringe
  - Rubber Stopper
  - Clamp
  - Ring stand

You should be comparing volume (using the syringe) and pressure (number of books)

2. Once you have devised a plan you may set up your apparatus and begin testing. Use a data table like the one that follows to record your test results.

***CLASS COPY DO NOT REMOVE OR WRITE ON***

**DATA and CALCULATIONS:**

Pressure (Number of Books)	Volume Trial 1	Volume Trial 2	Volume Trial 3	Average Volume	1/Volume	Total Pressure $P_T = \left(\frac{1}{V} + \# \text{ of books}\right)$	$P_T \times V_{avg}$
1							
2							
3							
4							
5							

**Analysis**

1. Make a line graph showing pressure measured in units of "Number of Books" on the Y-axis vs. Average Volume on the x-axis.
2. Make another line graph showing Total Pressure on the y-axis vs. 1/Volume on the x axis. The values of 1/Volume should be graphed in decimal form. (Divide 1 by the volume of the syringe)

**Questions**

1. Identify the shape of graph #1. Explain the graph.
2. Identify the shape of graph #2. Explain the graph.
3. Make a general statement concerning the relationship of pressure on the volume of a confined gas. (ex. what happens to a gas pressure when volume increases, what happens when volume decreases, etc.
4. In your opinion, would the results be different if CO<sub>2</sub> were used? Why?
5. Explain how the air pressure was determined in book units.

***CLASS COPY DO NOT REMOVE OR WRITE ON***